

# MALIGNANT MELANOMA OF THE CHOROID IN THE EYE WITH OCULODERMAL MELANOCYTOSIS OF A CHINESE WOMAN

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In this study, we report a rare case of choroidal melanoma in an eye with oculodermal melanocytosis (Nevus of Ota). A 56-year-old Taiwanese woman with oculodermal melanocytosis in the right eye was found to have an ipsilateral uveal melanoma. Histopathology of the enucleated eye confirmed the diagnosis of malignant choroidal melanoma of mixed cell type. A search of the literature revealed strong evidence that oculodermal melanocytosis can predispose to the development of uveal melanoma in Caucasians. Only seven such cases have been reported in the East Asian population. This is believed to be the first such reported case in a patient of Chinese descent.

**Key Words:** malignant choroid melanoma, Nevus of Ota, oculodermal melanocytosis  
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Congenital hyperpigmentation of the episclera and uvea, along with cutaneous hyperpigmentation in the distribution of the first and second divisions of the trigeminal nerve, is called oculodermal melanocytosis (Nevus of Ota, or nevus fusco-caeruleus ophthalmomaxillaris) [1]. It was first described by Hulke in 1861 in a patient with unilateral hyperpigmentation of the face and sclera, and an ipsilateral choroidal melanoma [2]. About 80 years later, a Japanese dermatologist, Ota M, described several patients in Japan and clearly defined the syndrome as a clinical entity in 1939 [3]. It occurs frequently in East Asian (0.2–1.0%) and darker races, but rarely in Caucasians (0.04%). Open angle glaucoma and choroidal melanoma are rare ocular associations [1,4]. Malignant change of oculodermal melanocytosis is rare, and when it involves

the choroids, it has been reported mostly in Caucasians [5,6]. Only a few such cases have been reported in the East Asian population, including four Japanese, one Malaysian, one Indian and one Anglo-Indian [7–10]. To the best of our knowledge, this is the first reported case in a patient of Chinese descent.

## CASE PRESENTATION

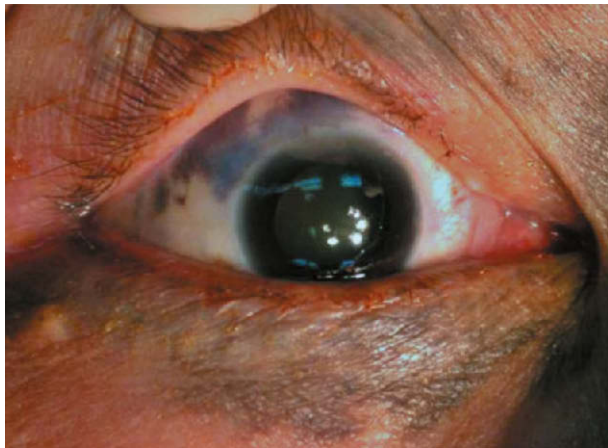
A 56-year-old Taiwanese woman, who was bothered by seeing water waves in the upper visual field of the right eye for more than 1 month, was referred for management of retinal detachment with choroidal tumor in May 2005. The patient was East Asian with black hair and mid-toned skin. Examination revealed bluish hyperpigmentation of the conjunctiva, episclera and periocular skin of the right eye (Figure 1). Her best-corrected visual acuity in both eyes was 20/20. Intraocular pressure was 15 mmHg for the right eye and 19 mmHg for the left eye. Fundoscopic examination revealed a bluish-black pigmented, elevated choroidal mass, larger than 10 disc diameters, in the lower nasal



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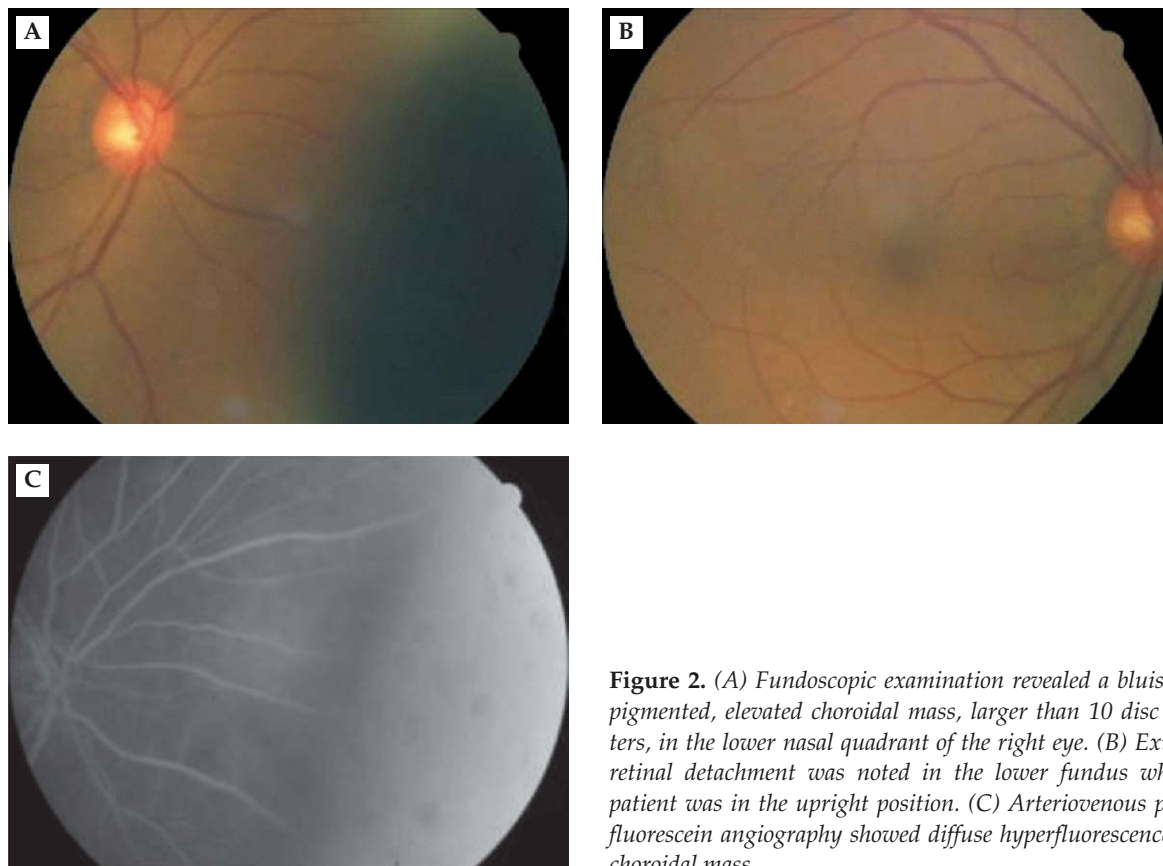
quadrant of the right eye (Figure 2A). The arteriovenous phase of fluorescein angiography showed diffuse hyperfluorescence of the choroidal mass (Figure 2B), and surrounding mottled hyperfluorescence. We did not observe the typical fluorescein angiographic finding of choroidal melanoma “double circulation” that simultaneously filled the normal retinal and tumor



**Figure 1.** Bluish and brownish hyperpigmentations of the conjunctiva, episclera and periocular skin of the right eye.

vessels. This might have been due to the large tumor basal diameter (>10 disc diameters) and thickness (about 10 mm). They both precluded the visibility of the tumor-feeding vessels. B-scan ultrasonography showed a choroidal mass, about 10 mm thick, and the corresponding A-scan revealed low internal reflectivity of the mass, which was suggestive of melanoma (Figure 3). Orbital computed tomography in May 2005 demonstrated an irregular, hyperdense soft-tissue lesion in the medial and posterior aspects of the right eyeball, with good enhancement (Figure 4A). It also showed exudative retinal detachment in the posterior pole when the patient was in the supine position. Choroidal melanoma was highly suspected.

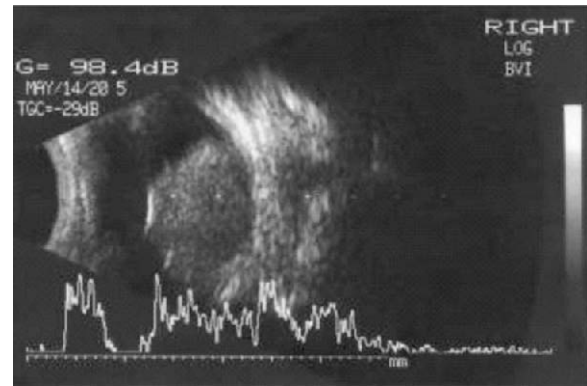
Enucleation was suggested but refused by the patient. Three months later, in August 2005, her best-corrected vision of the right eye dropped to 20/200. Subsequent magnetic resonance imaging revealed a choroidal mass in the medial aspects of the right eyeball. It increased in size with retinal detachment, but without invasion of the optic nerve. The mass appeared hyperintense on T1-weighted images and hypointense on T2-weighted images (Figure 4B).



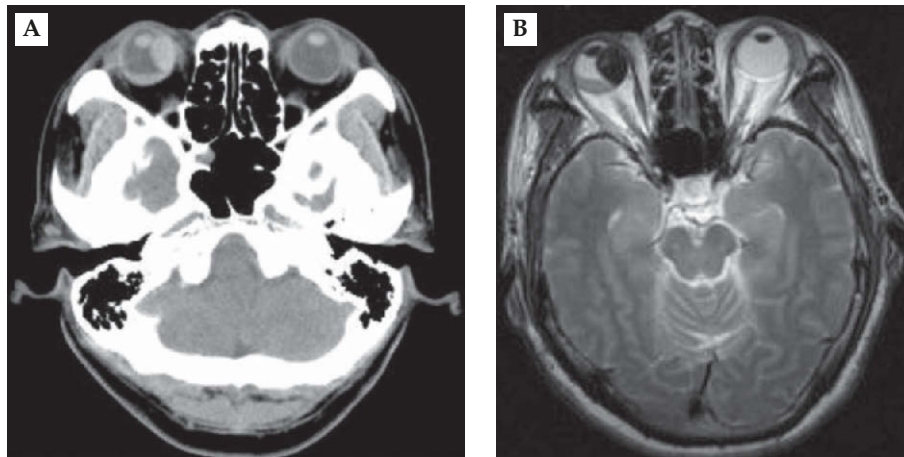
**Figure 2.** (A) Fundoscopic examination revealed a bluish-black pigmented, elevated choroidal mass, larger than 10 disc diameters, in the lower nasal quadrant of the right eye. (B) Exudative retinal detachment was noted in the lower fundus when the patient was in the upright position. (C) Arteriovenous phase of fluorescein angiography showed diffuse hyperfluorescence of the choroidal mass.

Enucleation was performed smoothly without rupture in August 2005. A 20-mm hydroxyapatite implant was inserted without any wrapping of donor sclera or artificial materials. The four rectus muscles were sutured in front of the implant. Tenon's capsule was sutured to wrap the anterior surface of the implant.

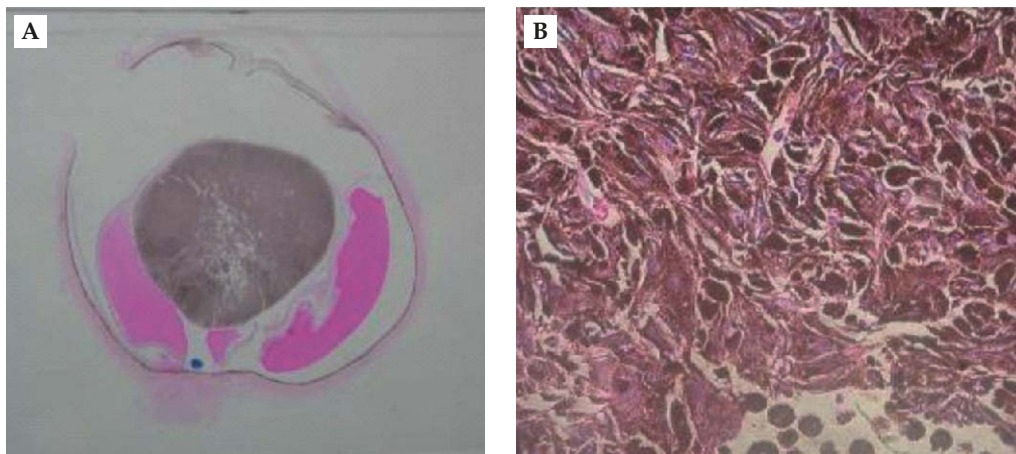
The enucleated eyeball measured  $29 \times 27 \times 25$  mm and the attached optic nerve measured 2 mm in length. Upon opening the eyeball through the meridional plane, a black solid tumor that measured up to 24 mm in greatest diameter was noted, without gross invasion of the optic nerve (Figure 5A). Microscopically, it showed malignant melanoma composed of melanotic cells with irregular contours and large, hyperchromatic



**Figure 3.** B-scan ultrasonography showed a choroidal mass, and the corresponding A-scan revealed low internal reflectivity of the mass, which was suggestive of melanoma.



**Figure 4.** Computed tomography and magnetic resonance imaging showed exudative retinal detachment in the posterior pole when the patient was in the supine position. (A) Orbital computed tomography demonstrated an irregular, hyperdense soft tissue lesion in the medial and posterior aspects of the right eyeball, with good enhancement. (B) Magnetic resonance imaging 3 months later showed an enlarged intraocular tumor that appeared hyperintense on T1-weighted images (not shown) and hypointense on T2-weighted images.



**Figure 5.** (A) Grossly, a black solid tumor that measured up to 24 mm in greatest diameter was noted. (B) Microscopically, it showed malignant melanoma that was composed of melanotic cells with irregular contours and large, hyperchromatic nuclei, as well as melanin pigment in the cytoplasm (hematoxylin and eosin, original magnification, 400 $\times$ ).



nuclei, as well as melanin pigment in the cytoplasm (Figure 5B). The Callender classification of this melanoma was mixed cell type. The neoplastic cells invaded the iris, ciliary body, choroid and sclera. The surgical margin was free of malignancy. The concluding pathology tumor, node, metastasis staging was pT3.

Work-up for systemic metastasis before enucleation showed a negative result. The patient received regular follow-up at ophthalmology and hematology-oncology outpatient clinics after the operation. After 1 year, however, abdominal sonography in August 2006 revealed lesions over both lobes of the liver. Abdominal computed tomography showed multiple liver and lumbar spine metastases that were confirmed by liver biopsy. The patient received systemic chemotherapy with cisplatin and dacarbazine and immunotherapy with interferon  $\alpha$  and aldesleukin (interleukin 2). Unfortunately, after receiving three courses of treatment, peritoneal carcinomatosis that presented as lower abdominal pain was diagnosed in June 2007. The patient passed away after transferring to the hospice ward in August 2007.

## DISCUSSION

Oculodermal melanocytosis (Nevus of Ota) has been reported in East Asians, Caucasians and blacks [1]. It is more common in East Asians (0.2–1.0%) than in Caucasians (Occidentals) (0.04%). Malignant change of oculodermal melanocytosis, which was previously believed to be rare, occurs in 4.6% of all reported cases. The incidence of malignant change is about 25% for Caucasians, 1% for blacks, and 0.5% for East Asians [6]. Malignant change in oculodermal melanocytosis has been reported to involve the choroid, skin, iris, orbit and brain. In this situation, the most common site for malignancy is the choroid, followed by the orbit [6]. When reported cases have involved the choroid, they have almost all been in Caucasians [5,6].

In Caucasians, an association between oculodermal melanocytosis and uveal melanoma is well recognized [11–13]. It is estimated that approximately 1 in 400 Caucasian patients with oculodermal melanocytosis will develop uveal melanoma in their lifetime, as compared with 1 in 13,000 in the general Caucasian population [14]. Therefore, oculodermal melanocytosis in Caucasians is usually watched closely for any malignant change at any time during their lifetime.

In contrast, only seven cases have been reported in East Asian populations [7–10]. A similar situation is observed in blacks [15–19]. This might be due to underreporting of uncomplicated cases.

Choroidal melanoma occurs predominantly in white populations. Dark-skinned patients represent only 1% of all cases of ocular melanoma [20]. Light skin pigmentation is known to be associated with cutaneous melanoma. The rarity of uveal melanoma among dark-skinned populations is also evident. Based on the above two reasons, Harbour et al predicted that light choroidal pigmentation might be a risk factor for posterior uveal melanoma [21]. However, they have found an association between darker choroidal pigmentation and posterior uveal melanoma in white patients. They have concluded that increased choroidal pigmentation is not protective, but might actually be a risk factor for the development of posterior uveal melanoma in white patients [21]. Consequently, they proposed three possible hypotheses to address this observation. The first explanation is that whites with dark choroidal pigmentation are at higher risk of oxidative DNA damage in choroidal melanocytes. Another explanation is that darker choroidal pigmentation represents a response to chronically higher levels of ultraviolet irradiation. A third possibility is a simple stochastic explanation. The more melanocytes that are present in the choroid, the more likely they will undergo malignant transformation. However, none of these can explain totally the paucity of choroidal melanoma in dark-skinned populations. Further investigation is needed to determine the role of choroidal pigmentation in the pathogenesis of uveal melanoma and the association with oculodermal melanocytosis.

Although it is rare, choroidal melanoma does occur in the presence of oculodermal melanocytosis in East Asians. To the best of our knowledge, this is the first reported case of uveal melanoma in a Chinese patient with oculodermal melanocytosis. From this case and previous Asian cases, we recommend that patients of any race with oculodermal melanocytosis should be followed regularly for potential malignant change.

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# 脈絡膜惡性黑色素瘤合併眼部皮膚黑色素沉積： 一華人女性病例報告

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我們提出一個太田母斑合併脈絡膜惡性黑色素瘤的罕見病例。一位 56 歲台灣女性罹有右側太田母斑合併同側脈絡膜惡性黑色素瘤。其摘除的眼球經組織病理學檢查證實為混合細胞型脈絡膜惡性黑色素瘤。文獻顯示太田母斑一般可能導致脈絡膜惡性黑色素瘤，但多發於白種人。在東方人，目前僅有七個報告病例。此為華人第一個報告病例。

**關鍵詞：**脈絡膜惡性黑色素瘤，太田母斑，眼部皮膚黑色素沉積  
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